

Motivation for radar cell-tracking studies of convective processes

- **Problem:** available observations (almost exclusively from radars) repeatedly demonstrate that weather and climate simulations of convective cells remain very poorly constrained
- **Motivation:** improve understanding and model representation of rapidly evolving processes and lag correlated microphysical and dynamical properties in convective cells (e.g., 5 m/s flows move ~2 km in 6-minute volume scan)
- **Approach:** observe the rapid evolution of convective cells at high spatial and temporal resolution, starting with isolated single cells
- **Proposal:** make it a priority to formulate and test automated real-time tracking and control algorithms for automated scanning polarimetric radars (e.g., C-SAPR and X-SAPR) suitable for ARM sites
- **Questions:** RHI or sector PPI approach? what is the optimal range of scan rates and elevation/azimuthal angles?

20-s RHI (top) and synthetic RHI from standard 6-min C-SAPR volumetric scan (bottom) of the same convective cell near Manus.
Source: Adam Varble/Univ. of Utah

Publication in preparation: Van Lier-Walqui, M. and 24 co-authors: Use of polarimetric radar measurements to constrain simulated early convective updraft evolution: A pilot study using Lagrangian tracking in a region susceptible to aerosol influences on microphysical processes. *ACPD, to be submitted*

